

Operation of the Lower Granite Dam Adult Trap, 2006

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Report of research by

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EXECUTIVE SUMMARY

During 2006 we operated the adult trap at Lower Granite Dam from 1 March through 22 November, except during short periods when water temperatures were high or when few fish were migrating. During this period, we collected and handled a total of 2,102 fall Chinook salmon *Oncorhynchus tshawytscha*. Of those fish, 728 adults and 431 jacks were transported to Lyons Ferry Hatchery on the Snake River in Washington. In addition, 406 adults and 213 jacks were transported to the Nez Perce Tribal Hatchery on the Clearwater River in Idaho. The remaining 324 fall Chinook salmon were passed upstream. We collected and handled a total of 18,347 steelhead *O. mykiss* and radio-tagged 120 of the hatchery fish with adipose fins intact. We also took scale and tissue samples from 2,603 spring/summer Chinook salmon for age and genetic analysis.

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INTRODUCTION

Collection and sampling of adult salmonids at Lower Granite Dam, the furthest upstream Snake River dam with adult fish passage, is an integral part of many studies. Use of the adult trap began in 1975 when Lower Granite Dam was completed (Harmon 2003), with operation conducted primarily by NOAA Fisheries staff, in cooperation with other agencies. Demands on use of the Lower Granite Dam adult trap have increased in recent years and are expected to continue to increase. Current uses include fall Chinook salmon *Oncorhynchus tshawytscha* broodstock collection, run-reconstruction sampling, sampling of fish tagged with passive integrated transponder (PIT) tags from transportation and life history studies, and radiotelemetry studies (with both tagging and tag removal at the adult trap).

Operation of the Lower Granite Dam adult trap will provide the following benefits to listed stocks:

- 1) Reduce risks to the fall Chinook salmon ESU by improving hatchery practices (i.e., providing the ability to collect and use natural-origin fish for broodstock in order to improve the integration between natural-origin and hatchery-origin fish).
- 2) Jump-start fall Chinook salmon production in underutilized areas of the Clearwater Basin by using natural-origin fish collected at the trap.
- 3) Reduce risks to ESUs from atypical straying of hatchery-origin fish from areas outside the Snake River Basin (i.e., allow the removal of unusual numbers of stray fish).
- 4) Provide age-class distribution and hatchery/wild composition for spring/summer Chinook salmon and steelhead *O. mykiss* returns to improve understanding of ESU status and provide critical information needed for run-reconstructions, and
- 5) Provide critical fall Chinook salmon life history information (from scale samples) to better manage the stock.

The adult trap at Lower Granite Dam has been operated for many years; however, the Bonneville Power Administration began funding trap operations in mid-2005. Here we report on adult trap operations for 2006.

METHODS

The adult salmonid trap is located adjacent to the south shore adult fish ladder at Lower Granite Dam on the Snake River at river kilometer 695 (from the mouth of the Columbia River). A complete description of the adult trap and its operation was reported by Harmon (2003). When in operation, a gate is rotated across the fish ladder to block upstream fish passage. Fish then enter the trap attraction pool and pass through pipes with coded-wire-tag (CWT) and PIT-tag detectors. Tagged fish are then diverted to a holding area (for PIT tagged fish, only those selected by tag code), while non-tagged adults continue through the pipes to the exit ladder where they re-enter the main fish ladder. Diversion gates can also be set to sample the run-at-large at a pre-selected sample rate.

The trap has a gravity-flow dewatering system that allows fish to pass directly from the holding area to an anesthetic tank without handling, which reduces stress on the fish. Fish are sedated with clove oil and inspected, and sample data are collected and recorded. Fish are then placed either in a freshwater recovery tank for release back to the fish ladder, or into holding tanks for eventual transfer to trucks to be hauled from the facility.

The adult trap is generally operated 7 d/week and 24 h/d during the adult migration period, beginning in early March and continuing through November each year, except during short periods in the summer when high water temperatures prevent its operation.

RESULTS AND DISCUSSION

During 2006 we operated the adult trap from 1 March to 22 November, except from 20 April to 4 May when the trap was closed between the spring steelhead run and a late spring Chinook salmon run, and from 21 July to 31 August because of high water temperatures. Fall Chinook salmon and steelhead were monitored from 1 September to 22 November with the sample rate for trapping adults set at 13%. Steelhead were also monitored from 1 March to 19 April at a 13% sample rate. Spring and summer Chinook salmon were monitored at a 10% sample rate from 5 May to 10 July and at a 7.5% rate from 11 to 20 July.

Samples were taken automatically four times an hour, 24 hours a day for the entire trapping period. We also interrogated previously PIT-tagged fall Chinook salmon for possible collection using the sort-by-code system. Sampled fish were inspected for species, lengths, injuries, brands, VI-tags, PIT-tags, and fin-clips. Scale samples were taken on some steelhead and fall Chinook salmon. Scale and tissue samples were also taken from all spring and summer Chinook salmon. Fall Chinook salmon collected at the trap and transported to hatcheries were inoculated and their opercula punched. The following data is preliminary and will be further analyzed by the various researchers from other agencies for which the data were collected. for.

We collected and handled a total of 2,102 fall Chinook salmon (Table 1). Of those fish, 728 adults and 431 jacks were transported to Lyons Ferry Hatchery on the Snake River in Washington. In addition, 406 adults and 213 jacks were transported to the Nez Perce Tribal Hatchery on the Clearwater River in Idaho. The remaining 324 fall Chinook salmon were passed upstream.

Table 1. Number of adult salmonids collected and handled at the Lower Granite Adult trap during 2006.

Species	Number collected
Fall Chinook	2,102
Spring Chinook	1,913
Summer Chinook	690
Steelhead	18,347

Run reconstruction and hatchery data taken from the 13% sample, and data collected from fall Chinook salmon transported to the hatcheries has not been finalized, but will be available in the future from the Washington Department of Wildlife (Debbie Milks, WDFW, personal communication). Scales samples were taken from 141 PIT-tagged fall Chinook salmon that were collected by the sort-by-code system. More detailed information on this study is available from the National Marine Fisheries Service (Doug Marsh, NMFS, personal communication).

A total of 18,347 steelhead were collected and handled during the sampling period (Table 1). Of those fish, 1,181 were sampled during spring and 17,166 were sampled during fall. Data taken from these fish will be analyzed to evaluate the A- and B-run segments as well as the hatchery/wild composition of the run. Data will be analyzed and reported by the Idaho Department of Fish and Game (Bill Horton, IDFG, personal communication). We also documented 23 freeze brands on steelhead that were released in the Snake River Basin as juveniles. Additional information on these fish is available from the WDFW and U.S. Fish and Wildlife Service (Mark Shuck, WDFW and Ralph Roseberg, USFWS, personal communication).

We also collected and handled 1,913 spring Chinook salmon and 690 summer Chinook salmon (Table 1). Scale and tissue samples were taken from all fish and will be analyzed by IDFG. Age structure will be determined from scales and genetic analysis will be performed on tissue samples. Information on these analyses will be available from IDFG (Jody White, IDFG, personal communication).

We radio-tagged 120 hatchery steelhead with adipose fins intact for the USFWS. Information about this study is available from the USFWS (Aaron Garcia, USFWS, Dworshak National Fish Hatchery, personal communication).

ACKNOWLEDGMENTS

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REFERENCES

Harmon, J. R. 2003. A trap for handling adult anadromous salmonids at Lower Granite Dam on the Snake River Washington. North American Journal of Fisheries Management 23:989-992.